

OPERATIONAL DEVELOPMENT

Mesa County Real Time Virtual Reference Network (RTVRN)

http://www.imap.mesacounty.us/GPS_Survey/GPS_Survey.htm

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Mesa County is located in the State of Colorado on the Western Slope of the Rocky Mountains. The largest city in Mesa County is Grand Junction and is centrally located in the County. Mesa County's RTVRN is a public and private cooperative effort operating and maintaining an array of GNSS reference stations covering a large part of Western Colorado containing more than 21,000 square miles. The Network simultaneously processes the GNSS data in real time and re-broadcasts customized corrections to users at sub-centimeter level precisions. The users consist of fixed and mobile applications that include surveying, engineering, construction, agricultural, public safety, Landfill operations, environmental/GIS mapping and scientific research (e.g. plate tectonics, atmospheric, and collegiate studies) at all levels of government, academic, public utilities and transportation.

The Network is totally reliant on the GPS L1 signal and nearly all users depend on the real time resolution of the GPS signal ambiguity to less than 2 centimeters 3 dimensionally (latitude, longitude, altitude). These high precision applications are dependent on the predictability and access to low noise GPS signals in the network area.

Any degradation or loss of GPS signal and the availability of the service the Network provides would be very detrimental to all capital improvement projects constructability, budgets, and contracts that use this service including internal County operations such as Landfill design, phasing, tracking and construction.

Since the Network went operational in 2006 capital improvement budgets in Local, County, and State governments as well as Public utilities have come to realize the large engineering cost savings and efficiency provided by the instantaneous nature of Network correction data.

On projects Engineers, Surveyors, and others are required to specifically bid by line item the cost associated with the high precision construction and Digital Terrain Models (DTM's) staking. Any interruption or uncertainty in the GPS signal or service would cause a surmountable increase in cost of all capital improvement projects and internal County operations. This would require using conventional methods that at any rate would be costly and efficiencies would decrease dramatically. Estimates on using the Network service saves 50 to 65 percent of engineering and surveying related tasks over conventional methods. Some tasks or operations done with GPS network services would not exist such as Landfill Compactor tracking.

The following describes the operational effect on the Network and ALL of the users as a result of

disruption in available GPS coverage due to the introduction of terrestrial transmissions in the L-band adjacent to GPS signal operations:

??? Landfill Compactor tracking would be impossible to continue that deters illegal dumping. In 2002 during the initial stages of Network implementation where a GPS real time reference station had been placed at the Landfill several years earlier, a body was discovered after being in the Landfill for approximately 7 months and a person was successfully prosecuted due to waste placement position tracking and modeling of the crime scene using real time GPS corrections. Landfill tipping fees would have to increase to cover additional surveying and engineering costs.

??? The County, City and State Department of Transportation saves multi-millions annually. The loss of this GPS Network due to a reliability issue with the L1 band would raise Transportation costs by several millions.

??? Public Utilities would have increased costs in the hundreds of thousands in operational, maintenance, and construction of infrastructure.

??? Private surveyors would be forced to use antiquated and cumbersome conventional surveying methods to do tasks on private and public projects costing taxpayers millions.

??? Other applications such as engineering, construction, and agriculture could not perform efficiently and economically that would cost millions.

??? Scientific users would not have access to real time or post process GPS data for research and studies. USGS and NGS could not utilize GPS data from the Network reference stations for the geodetic reference network or Continuously Operating Reference Stations (CORS) and information on floodplain vertical datums. The NOAA Earth Systems Research Laboratory in Boulder, Colorado could not utilize real time GPS data from the Network for their atmospheric research and weather modeling.

In my opinion if there is any disruption or discontinuance of the GNSS signals it will cost the taxpayers millions and maybe billions of dollars and literally throw Mesa County and ALL who use the RTVRN back into the Dark Ages of the Data and Information Technology era. There would be some applications that could not be accomplished or would be impossible to do so.